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Predictions for dense matter and neutron stars from the gauge/gravity duality

The gauge/gravity duality, combined with information from lattice QCD, nuclear theory, and perturbative QCD, can be used to obtain predictions for the equation of state and transport in hot and dense QCD. I give an overview of an approach based on the holographic V-QCD model, which includes both nuclear and quark matter phases, separated by a first order phase transition. I demonstrate that the model includes an spatially modulated instability in the deconfined phase, which potentially extends to the region reachable in lattice and experimental studies in near future. By using the model in state-of-the-art simulations of neutron star binaries, I study the formation of quark matter during the merger process, and its effect on the threshold mass for prompt collapse into a black hole. I also discuss analysis of the bulk viscosity and predictions for neutrino transport in the quark matter phase.

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